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10/642,637

08/19/2003

Huan-Li Wen

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EXAMINER

NOVACEK, CHRISTY L

ART UNIT

PAPER NUMBER

2822

DATE MAILED: 08/26/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/642,637

Applicant(s)

WEN, HUAN-LI

Examiner

Christy L. Novacek

Art Unit

2822

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 19 August 2003.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-17 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-17 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 August 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_.
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_.

### **DETAILED ACTION**

This office action is in response to the communication filed August 19, 2003.

#### ***Specification***

The disclosure is objected to because of the following informalities: At line 17 of page 1, “smaller” should be changed to “small”.

Appropriate correction is required.

#### ***Claim Objections***

Claims 11 and 16 are objected to because of the following informalities:

At line 5 of claim 11, “sides” should be changed to “surfaces” in order to be in accordance with language in line 3 of that claim.

Similarly, at line 3 of claim 16, “sides” should be changed to “surfaces” in order to be in accordance with language in line 5 of claim 12.

Appropriate correction is required.

#### ***Claim Rejections - 35 USC § 102***

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-3 and 6 are rejected under 35 U.S.C. 102(e) as being anticipated by Farnworth et al. (US 6,437,591).

Regarding claim 1, Farnworth discloses drilling a substrate (12) to form a plurality of holes (20A) therein, overlaying a copper foil (22A) on the substrate, and etching the copper foil to form contact spring arms in the holes and circuit lines (22A/30A) extended from the spring arms (Fig. 2B; col. 4, ln. 35 – col. 6, ln. 46).

Regarding claims 2, the copper foil can be electroplated (col. 6, ln. 14-16). The foil is part of a circuit in the substrate (col. 6, ln. 26-56).

Regarding claims 3, the contact spring arms are suspended from the substrate for the contact of electronic member means (18) (Fig. 3A-3B; col. 2, ln. 6-16; col. 6, ln. 57-64).

Regarding claim 6, the holes are blind holes (Fig. 2B).

Claims 1, 3-7 and 9-17 are rejected under 35 U.S.C. 102(e) as being anticipated by Canella (US 20030042595).

Regarding claim 1, Canella discloses drilling a substrate (120) to form a plurality of holes (126) therein, overlaying a copper foil (130) on the substrate, and etching the copper foil to form contact spring arms (160) in the holes and circuit lines (132) extended from the spring arms (Fig. 3, 4; para. 42-50, 75).

Regarding claims 3 and 9, Canella discloses that the contact spring arms are suspended from the substrate for the contact of electronic member means (10) (Fig. 5).

Regarding claims 4, 10 and 17, Canella discloses that the electronic member (10) includes a circuit board (30) (Fig. 2).

Regarding claims 5 and 14, Canella discloses that the copper foil may be overlaid on both a top and bottom surface of the substrate (Fig. 16; para. 64-67).

Regarding claim 6, Canella discloses that the holes may be blind holes (Fig. 8).

Regarding claim 7, Canella discloses a substrate having a plurality of holes drilled therein, copper foils overlaid on the surfaces of the holes, contact spring arms in the holes formed by the etching of the copper foils and circuit lines also formed (Fig. 3, 4, 16; para. 42-50, 64-67, 75).

Regarding claim 11, Canella discloses that the copper foil may be partially overlaid on both a top and bottom surface of the substrate during the copper foil overlaying and etched during the step to form the contact spring arms at top and bottom surfaces of the substrate (Fig. 16; para. 64-67).

Regarding claim 12, Canella discloses a substrate having a plurality of through holes, at least one copper foil located in a surface of the substrate, a plurality of contact spring arms corresponding to the through holes and a plurality of circuit lines extended from the spring arms for the contact of at least one electronic member (Fig. 3, 4, 16; para. 42-50, 64-67, 75).

Regarding claim 13, Canella discloses that the circuit lines (132) are integral with the contact spring arms (160) (Fig. 3).

Regarding claim 15, Canella discloses that the copper foil is overlaid on surfaces of the through holes.

Regarding claim 16, Canella discloses that the contact spring arms can be suspended on top and bottom surfaces of the substrate (Fig. 16; para. 64-67).

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The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 2 and 8 are rejected under 35 U.S.C. 103(a) as being unpatentable over Canella (US 20030042595) in view of Farnworth et al. (US 6,437,591).

Regarding claims 2 and 8, Canella discloses that the copper foil may be formed by “chemical vapor deposition (CVD) or any other suitable deposition process known in the art” (para. 43). Canella does not specifically disclose using electroplating to deposit the copper foil. Like Canella, Farnworth discloses depositing a copper foil on a substrate, wherein the copper foil is to be used to form contact spring arms that will electrically connect a semiconductor package to a test substrate. Farnworth states that either CVD or electrodeposition can be used to successfully deposit the copper foil on the substrate (col. 6, ln. 14-16). At the time of the invention, it would have been obvious to one of ordinary skill in the art to deposit the copper foil of Canella by electroplating because Canella states that any suitable process “known in the art” can be used to deposit the copper and Farnworth teaches that electroplating is a suitable process known in the art.

Claim 4 is rejected under 35 U.S.C. 103(a) as being unpatentable over Farnworth et al. (US 6,437,591) in view of Jiang (US 6,774,480).

Regarding claim 4, Farnworth discloses that the electronic member connected to the substrate may be chip-scale semiconductor packages (col. 1, ln. 10-26). Farnworth does not

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specifically disclose that the chip-scale semiconductor package includes a circuit board. Jiang states that it is conventional in the art to form a chip-scale semiconductor package by mounting a semiconductor die onto a circuit board (col. 1, ln. 59 – col. 2, ln. 20). At the time of the invention, it would have been obvious to one of ordinary skill in the art to attach a chip-scale semiconductor package containing a circuit board to the substrate because Farnworth recites attaching a chip-scale package to the substrate and Jiang discloses that a typical chip-scale package include a circuit board.

### ***Conclusion***

The prior art made of record and not relied upon is considered pertinent to applicant's disclosure:

Hirai et al. (US 6,517,362), Fjelstad (US 5,983,492), Fjelstad et al. (US 5,802,699), Grabbe (US 5,173,055) and Reimer (US 3,670,409) disclose forming contact spring arms on a substrate to electrically engage an IC device.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Christy L. Novacek whose telephone number is (571) 272-1839. The examiner can normally be reached on Monday-Thursday and alternate Fridays 7:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Amir Zarabian can be reached on (571) 272-1852. The fax phone number for the organization where this application or proceeding is assigned is 703-872-9306.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

CLN

August 23, 2004



Michael Trinh  
Primary Examiner  
*Act SPE*